



Pine Oaks Golf Course
Environmental Baseline Assessment
Robins AFB, Georgia Apr 03



Executive Summary

U. S. AIR FORCE GEM PROGRAM GOALS

The U. S. Air Force Golf Course Environmental Management (GEM) program is a proactive Air Force Center for Environmental Excellence (AFCEE) initiative to foster a better understanding of the environmental challenges facing our golf courses worldwide. Armed with the support and approval of the Air Force Services Agency golf program, AFCEE's goal is to facilitate the creation of an environmentally friendly golf course facility while supporting the mission.

The primary tenets of the GEM Program are to minimize or eliminate potential negative environmental impacts, attain and maintain daily compliance with all appropriate regulations, and constantly examine our processes on all aspects of golf course management to achieve the highest standards of environmental excellence.

GEM PROGRAM PROCESS

There are five steps in the GEM program process.

- Analysis
- Documentation
- Implementation
- Evaluation
- Revision

This report is the result of the analysis step.

PINE OAKS GOLF COURSE ROBINS AFB, GEORGIA ENVIRONMENTAL CHALLENGES

The following environmental challenges were identified during the GCEBA process:

- Erosion control/cultural resources
- Audubon Certified Cooperative Sanctuary Program
- Water conservation & water quality management
- State listed rare plant species
- Tree management
- Greens reconstruction project

Further information on the environmental challenges at Pine Oaks Golf Course can be found in the Conclusion of this Golf Course Environmental Baseline Assessment.

WHERE DO WE GO FROM HERE?

The golf course staff should determine their preferred management approach for the challenges above in context with their ongoing goals of providing the best golfing experience for the money. They should then coordinate these practices with the installation environmental staff to ensure their compatibility with installation wide natural resources and environmental goals and objectives followed by implementation.

Table of Contents

Introduction	3
Program Process.....	4
Course Specific Analysis	7
Miscellaneous Facility Review	8
Overall Management Philosophy & Documentation	14
Safety, Training, & Awareness	16
Compliance	18
Pesticide Use, Storage, & Handling.....	20
Pollution Prevention	22
Conservation Practices	24
Water Resources	26
Maintenance Practices.....	28
Customer Relations & Education.....	30
Miscellaneous Special Projects & Activities.....	32
ECQ Summary	34
GCEBA Results	34
Conclusion.....	35
Bibliography	42



Introduction

The golf course environmental baseline assessment (GCEBA) is the initial step in the process of creating a successful ecosystem-based Golf Course Environmental Management (GEM) Plan.

The ultimate intent of the program is to provide a foolproof, customer-driven management tool that will free up course managers and superintendents to devote more of their efforts to caring for their customers and the course. Properly designed and implemented, the GEM Plan will keep the facility in compliance with the ever-changing environmental rules and regulations while providing a vital recreational opportunity for the installation.



Natural water features abound at Pine Oaks Golf Course.



The back patio is just another inviting amenity available to customers.

Goal of the GEM Program

The goal of the U. S. Air Force GEM program is to facilitate the creation of an environmentally friendly golf course facility for its customers while supporting the installation mission. The Air Force Center for Environmental Excellence (AFCEE) is dedicated to helping to identify ways that more rounds can be played on better-conditioned courses while minimizing or eliminating negative impacts to the environment. In most cases, the U. S. Air Force's golf courses are being managed compatibly with the environment. The GEM program is the vehicle to document our successes while communicating directly with the golfers, our commanders, and the local community.



The first green invites aggressive short iron play.

Program Process

Implementation is the most important phase of any initiative where practices and procedures are examined and may undergo significant change. This is especially true of the GEM Plan process. The specifics for the GEM Plan components and directions for their completion are delineated on AFCEE's Golf Course Environmental Management web site listed inside the back cover of this report.

The GEM Program is derived from many diverse environmental regimes such as the National Environmental Policy Act, the Environmental Compliance Assessment and Management Program, and the ISO 14000 environmental management system. The primary tenets of the GEM Program are

to minimize or eliminate potential negative environmental impacts, attain and maintain daily compliance with all appropriate regulations, and constantly examine our processes on all aspects of golf course management to achieve the highest standards of environmental excellence. There are five basic steps in the implementation of the GEM Program process:

- Analysis
- Documentation
- Implementation
- Evaluation
- Revision



Beautiful large and majestic trees are significant contributors to the character of the Pine Oaks golfing experience.



Superintendent Tommy Stinson wrangles another great deal.

Analysis

Experienced environmental managers realize the importance of assembling all of the data relevant to a problem prior to determining its best solution. Analysis is the first and most important task of the golf course environmental baseline assessment (GCEBA) and the GCEBA is the initial step in the process of creating an ecosystem-based Golf Course Environmental Management (GEM) Plan. Properly completing the GCEBA is paramount to the long-term compatibility of an installation's golf course management practices with the GEM Program, and more importantly, the U. S. Air Force's natural resource and environmental management goals and objectives.

GCEBA COMPONENTS

The GCEBA is comprised of the following components:

- Site visit, interviews, and data collection
- Course specific analysis
- Miscellaneous facility review
- Environmental compatibility quotient checklists
- Identification of environmental management challenges
- Summary report

Documentation

It is not enough just to know how to create a successful golf course environmental management program. There has to be a written record of existing site data, maintenance practices, pesticide applications, and other historical golf course activities. By documenting what we know, we will be able to determine how to make better decisions in the future. The completed GEM Plan will be a comprehensive report with a map that will assist in the daily management of the course while providing a convenient vehicle to communicate to our customers the environmental issues that challenge us on our golf course and our plans to deal with them. In order to reach the environmental stewardship goals set by the U. S. Air Force, we must consistently employ only those management practices that minimize or eliminate potential negative impacts to the environment.

GEM PLAN COMPONENTS

The GEM Plan will be comprised of the following components:

- GCEBA report
- Map of the entire golf course facility grounds depicting locations of the significant environmental management challenges and the golf course facilities
- Booklet that describes the environmental management challenges on the GEM Plan map
- Specific practices that will be employed by the golf course staff to deal with each environmental management challenge after coordination with and approval by the installation environmental staff
- Compilation of best management practices employed at the golf course in their implementation of the GEM program recommendations

Implementation

Positive and decisive action is the only true measure of the success of a GEM Program. By implementing new practices, whether to knowingly improve the course's role in the environmental stewardship of the installation or to just try new ideas to determine their value, will the golf staff and golfers benefit. The Pine Oaks staff should adopt the GEM Program Environmental Policy and immediately begin finding ways to minimize or eliminate any and all negative impacts to the environment.

Evaluation

In order to ensure the highest quality of customer service and environmental stewardship, there must be continual self-evaluation and improvement. There also should be consistent, on-going measurement of the reduction or elimination of environmental impacts the newly implemented practices have on the course. For example, documenting the reduced use of inputs such as fertilizers, pesticides, and irrigation can be used to demonstrate the increased environmental stewardship of the golf course management practices as well as the overall value of the GEM Program. It is important for U. S. Air Force golf courses to show improvement over time. This can be easily accomplished by regularly evaluating golf course maintenance methods, practices, and management approaches to day-to-day issues and changing when appropriate.

Revision

The very nature of a superior GEM program implies that all documents be regularly maintained to represent the most current conditions. U. S. Air Force golf course managers and superintendents should be constantly looking for ways to improve their environmental stewardship. Acting on lessons learned is right behind initial implementation as the most important aspect of a successful GEM Program. The GEM Plan should be kept as current as possible at all times. Ideally, it should be completely updated at least every three years.

Course Specific Analysis

One of the most pragmatic and enjoyable tasks in the GCEBA process is the course specific analysis. From a general overall description of the course to the details of the course's history and makeup to the various observations on the way the course plays, looks, and is managed, the course specific analysis sets the stage for the rest of the GCEBA report. It is comprised of the following tasks:

- Course description
- Course details
- Miscellaneous facilities review



This area of the 14th will be transformed into the new 13th tee.

Course description

Robins AFB's Pine Oaks Golf Course satisfies and refreshes. Constructed 9 holes at a time over a decade spanning the late 1950s and 1960s, Pine Oaks Golf Course uniquely traverses several small parcels of land on the installation. At least 3 distinct sites are used to formulate the interesting and attractive 18-hole layout.

Rolling parkland best describes the course as it tosses and tumbles over oak and pine studded relatively flat fairway landforms for much of the round.

Course details

Architect	Civil Engineering
Year constructed	1959/1968
Climate	Humid w/ high rainfall
Average annual rainfall	35-45 inches
Winds/Prevailing Direction	Southwest
Total Facility Acreage	350
Par	36-35-71
Yardage/Rating/Slope	Blue- 6343/71.0/125 White- 6059/69.7/121 Red- 5530/72.3/125
Golf course manager	John Anderson
Superintendent	Tommy Stinson
Turfgrass	Tees Tifway 419 Bermudagrass
	Fairways Tifway 419 Bermudagrass
	Greens Tifdwarf 328 Bermuda*
	Roughs Tifway 419 Bermudagrass

* New greens will be turfed with Tif Eagle.

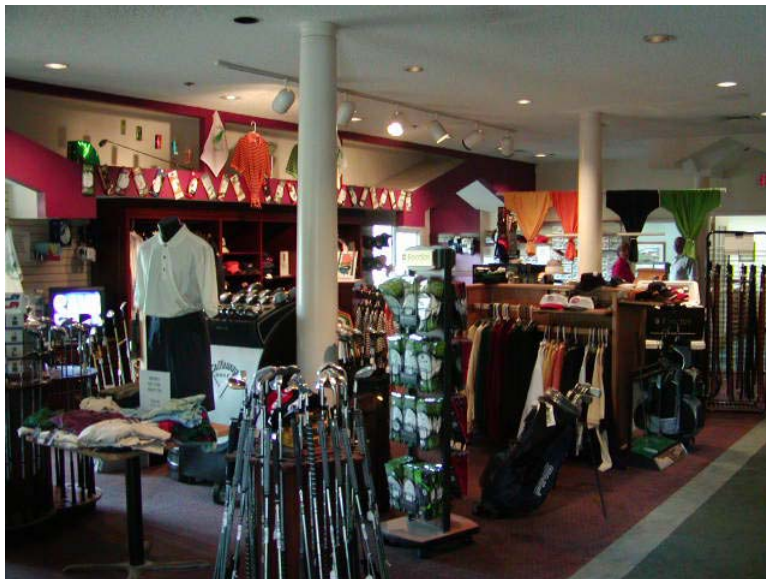
Miscellaneous Facility Review

Although the course is primary to the enjoyment and eventual return of most of Course Name' customers, the support facilities play a huge role in the overall success of the operation. This section of the GCEBA will examine the following facilities for their aesthetic, functional, and environmental values:

- Clubhouse/pro shop/snack bar
- Practice areas
- Maintenance complex
- Pesticide mixing and storage
- Cart barn
- Infrastructure



The charming and stately clubhouse hardly looks the part.



Well-stocked and neatly kept, the pro shop sets the stage for the round.

Clubhouse

As the newcomer approaches to the Pine Oaks Golf Course clubhouse, there is a sense of visiting one of the Old South's regal plantations. Extremely well-designed within the installation's architectural compatibility requirements, the clubhouse efficiently provides a quality visual and utilitarian experience for customers and staff alike. Director of Golf, John Anderson, has a fine facility that is replete with ample space for offices, snack bar, dining areas, pro shop, locker rooms, and an "extra" tournament room that adds a large measure of versatility to the operation. To top all of these amenities off, the clubhouse grounds have an additional dining opportunity off the back patio and a tournament scoring area.



The putting green at Pine Oaks is large and conveniently located.

Practice areas

The Robins AFB facility is outfitted with a small to medium driving range and a large putting green. The range could be improved with better turf on the teeing area and could use a taller fence to keep some of the balls within its bounds. The putting green is located between the pro shop and the first tee offering the Pine Oaks GC customers an opportunity to warm up their flat sticks prior to their round.



Metal shelves, dry above liquid, and palletized bags fit the bill.

Pesticide mixing and storage

The pesticide storage facility is one of the few areas of the Pine Oaks GC operation that could use significant improvements. Pesticides are stored properly yet the storage areas really should be separated physically from the maintenance facility. The mixing area is just outside and although it is functional, it is minimally so and could be more compatible with the overall environmental goals by also being relocated and updated to meet more stringent requirements and evaluation criteria.



Cart barn features parallel parking and drive-thru doors on each side.

Cart barn

The existing cart barn is designed and constructed of a similar style as the clubhouse and is located nearby. Recently updated, the facility provides enough room inside to allow for a variety of parking arrangements. The current configuration seems adequately sized, efficient, functional, and attractive both inside and out.



Great cart paths could still use improvement with curbing near tees.

Infrastructure

This section examines important elements of a quality golf course that are difficult to group into another category. Cart paths are mostly 6-8 foot wide concrete and are in good condition. The parking lot is in good condition and seems large enough to satisfy the regular demands of the course's customers. Landscape development attempts have had mixed results and should be continued where appropriate with a little more consideration for the plant materials fitting the bill for their chosen locations. There is a site amenity group near most teeing areas and the course signage could be improved.

Maintenance complex

The maintenance complex is of sufficient size to allow for an extremely well organized, clean and functional operation. Seemingly ample space for equipment, parking, storage, and administrative areas have been provided for the professionally run operation.

The fertilizer storage facility and the pesticide mixing and storage facility are close by for convenience and easy management. The complex grounds could be better maintained, especially the entrance. First impressions sometimes are the only ones that last....



Mechanic's area.



Entrance to complex is immediately adjacent to customer parking area.



Interior equipment storage seems adequate.

Environmental Compatibility Quotient Checklists

The following is a brief compilation of some of the observations in each of the ten Environmental Compatibility Quotient (ECQ) categories during the site visit.

ECQ Categories

- Overall Management Philosophy & Documentation
- Safety, Training, And Awareness
- Compliance
- Pesticide Use, Storage, & Handling
- Pollution Prevention
- Conservation Practices
- Water Resources
- Maintenance Practices
- Customer Relations & Education
- Miscellaneous Special Projects & Activities

ECQ Checklists

The Environmental Compatibility Quotient (ECQ) checklists are a convenient method of assessing the overall performance, implementation, and completeness of an installation's Golf Course Environmental Management Plan. The checklists can be used in many ways including:

- As an analytical tool while compiling a Golf Course Environmental Baseline Assessment like this one.
- As a self-assessment tool for the golf course manager or superintendent.
- As an award nomination evaluation by a Golf Course Assessment Team (GCAT).



Even the rear of the clubhouse is attractively appointed.



Water quality continues to be a challenge for the installation.

Key to checklist responses

- **Yes** = Practice is complete or ongoing and can be verified.
- **Partial** = Practice has been initiated but needs further attention and improvement.
- **No** = Practice is not in place.

Determining the Environmental Compatibility Quotient

The ECQ compiled for an installation's course is a snapshot of the overall performance and compliance with the GEM Plan. There are two ways to use the ECQ checklists to determine the status or quality of the environmental management program: determining the actual and potential environmental compatibility quotients.

- **Actual ECQ**- the total percentage of "Yes" responses for all ten checklists.
- **Potential ECQ**- the total percentage of "Yes" responses plus the total percentage of "Partial" responses for all ten checklists.

ECQ Scoring Scale

Percent Responses Yes or Partial per Category	Level
93-100%	Advanced
83-92%	Getting there
73-82%	Showing progress
63-72%	Early stages
Less than 62%	Just started

Overall Management Philosophy & Documentation

U.S. Air Force GEM program goals

- Enhance the installation ecologically and economically
- Demonstrate that the golf course is managed with consideration for the unique conditions of the ecosystem of which it is a part
- Document management practices to promote more widespread understanding and appreciation for environmentally sound golf course facilities
- Share information on the environmental opportunities and constraints of your golf facility with your customers, the golfers

Observations

- Higher aesthetic and playability thresholds are in the works for the new greens
- Condensing number of managed environmental documents to fit in one binder should prove more efficient
- Implement planned improvements to all aspects of the golf facility management
- Utilize installation environmental management geographic information system and civil engineering digital aerial photographs for mapping requirements

- Need to secure computer hardware and software upgrades to increase overall efficiency and provide high speed internet access
- Complete and maintain the golf course maintenance plan



There are numerous potential locations to share golf course environmental management plans and information with customers in the Pine Oaks clubhouse.

Overall Management Philosophy & Documentation				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Has management demonstrated that the environment is an important part of their responsibilities by initiating the GEM Planning process?	✓		
2	Has the golf course adopted and posted an Environmental Policy?		✓	
3	Is the GEM Plan underway or completed, available, and updated regularly?		✓	
4	Is a map of the property highlighting environmental challenges such as wildlife habitat, water resources, sensitive landscapes, special management zones, etc. posted for customers?			✓
5	Environmental goals, objectives, issues, projects, and progress are evaluated at least annually and are regularly communicated to employees, customers, management, and the local community?		✓	
6	Are written records of water quality monitoring activities, results, and control measures readily available?		✓	
7	Is there an inventory of bird and mammal species documented, maintained, and readily available?		✓	
8	Is there a general understanding of how course management practices may positively enhance or adversely impact wildlife species and their habitats?	✓		
9	Are the environmental impacts of pest control measures such as leaching and runoff potential, toxicity to non-target organisms, soil absorption capacity, pesticide persistence, water solubility, and effects on soil microorganisms and non-target species considered as part of the course management planning process?	✓		
10	Are records of pest treatments employed and their effectiveness maintained and used to guide future pest control decisions?	✓		
	Point totals for each column	4	5	1

Safety, Training, & Awareness

U.S. Air Force GEM program goals

- Educate all employees on the benefits of an ecosystem based golf course environmental management program
- Store and handle all potentially harmful products to minimize employee exposure
- Regularly train employees on the potential health hazards associated with their duties
- Involve entire staff in ensuring a safe golfing opportunity for their customers



Environmentally sensitive areas can be excluded from play by an appropriate government body or agency.



Fertilizer storage is properly secured and signed.

Observations

- Need to address safety of golfers and employees at all road crossings
- Signs needed for vehicle operators at the 7th and 8th holes
- Demonstrate genuine concern for player health and safety through actions
- No equipment fueling available forcing employees to travel with fuel containers
- Lack of funding hinders training plans

Safety, Training, & Awareness				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	All employees are familiar with the GEM Plan and are trained regularly on the importance of environmental performance and compliance with the goals and objectives of the program?			✓
2	All appropriate employees are trained to be familiar with USAF, federal, state, and OSHA regulations that apply to storage and handling of chemicals used on the property?	✓		
3	Key employees are aware that chemical manufacturing, use, storage, and disposal may pose risks to human health and the environment?	✓		
4	Key employees are trained to understand that poor management practices may adversely impact worker health, on- and off-site water quality, local soil health, and wildlife species and their habitats?		✓	
5	A current copy of all Material Safety Data Sheets (MSDS) for all chemicals used anywhere on the golf course property is maintained and readily available for use by employees?	✓		
6	Chemical applicators are encouraged to apply for continuing education programs and receive regular training to maintain currency?	✓		
7	Are all golf course pesticide applicators active participants in the local respiratory, blood testing, and pulmonary function testing program?		✓	
8	Pesticides, fertilizers, and other chemicals are stored on plastic or metal shelving?		✓	
9	Are golfers notified in the pro shop and on the first and tenth tees about the day's planned or recently completed spraying of any chemical or fertilizer that may be hazardous to human health and safety?		✓	
10	Are key staff members trained regarding water quality and conservation issues?		✓	
	Point totals for each column - Response percentage	4	5	1

Compliance

U.S. Air Force GEM program goals

- Integrate management practices with appropriate regulatory requirements and procedures
- Guarantee safe, healthy, and enjoyable experience for golfers while ensuring long-term operation of the facility
- Utilize installation expertise regularly on all matters dealing with bird aircraft strike hazards, regulators, impact analysis, and cleanup



Water quality and conservation lead the list of challenges.



Archaeological investigations continue throughout the course.

Observations

- Assemble all documents in one place
- Do more than what is required
- Need to correctly install fueling station for maintenance complex
- Ensure ECAMP results are outstanding
- Continue building quality relationships with installation environmental and engineering staff

Compliance				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Is fuel storage/delivery managed in accordance with federal, state and local regulations?	✓		
2	Are installation environmental staff members included in on-going course management discussions and plans at regularly scheduled meetings?		✓	
3	Are there regularly scheduled staff meetings to discuss environmental management issues?		✓	
4	Does the director of golf and the superintendent attend ECAMP in-briefings and out-briefings?		✓	
5	Does the director of golf and/or the superintendent coordinate with installation environmental staff on the various management plans that affect or include the golf course?		✓	
6	Have all necessary permits been updated and their requirements satisfied in a timely manner?	✓		
7	Has appropriate impact analysis (NEPA) been performed on all proposed actions on or affecting the golf course property?	✓		
8	Are containers used to store used oil in good condition, not leaking, and clearly labeled?	✓		
9	Are oil/water separators operating properly and correctly maintained?	✓		
10	Are projects planned and funded for the next year that would increase the compatibility of the course's management methods with the environment?	✓		
Point totals for each column - Response percentage		6	4	0

Pesticide Use, Storage, & Handling

U.S. Air Force GEM program goals

- Ensure that all chemicals will be used, stored, and handled in appropriate manner at all times
- Compile and utilize an Integrated Pest Management approach to caring for the entire golf facility
- Licensed pest applicators will be strongly encouraged to attend personal safety training and health monitoring programs



Pesticide mixing area is in need of modernization.



Pesticide storage area signage gets the message across.

Observations

- Although the pesticide mixing area is fully compliant, it is in need of major update. Suggest programming new project construction funding
- Fertilizer storage facility is a perfect example deserving emulation by any golf course maintenance operation
- Existing mixing area sump pump needs improvements

Pesticide Use, Storage, & Handling				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are there trained scouts on staff other than the superintendent to monitor turf and plant health and pest populations using scouting forms to record the type, severity, location, and treatment of pest problems and organized into a report or guide so that they can be used for future pest control solutions?	✓		
2	Are there written pest profiles of common pest species with a variety of potential control measures pre-evaluated including alterations in cultural management, biological, physical, and mechanical controls prior to treating the problem on the course?	✓		
3	Are there established and documented aesthetic and functional thresholds for all managed areas to effectively manage pest populations and reduce chemical use?		✓	
4	Is there a specially and appropriately designed pesticide mixing area where all mixing occurs by only trained personnel?		✓	
5	Has a list of pesticides and other chemicals stored or used at the golf facility been provided to the appropriate Fire Department(s)?	✓		
6	Is there a written Integrated Pest Management Plan readily available and updated regularly in use at the facility?	✓		
7	Are food storage and prep areas properly cleaned to reduce the likelihood of pest infestations and required pesticide applications?	✓		
8	Are scouting forms collected, indexed, and mapped to aid decisions for positive pest control planning?			✓
9	Are written and readily available records maintained of all applications of pesticides made by certified applicators, including the following? - the quantity of each pesticide used - the chemical or common name of the active pesticidal ingredient(s) (not the product name) - the pest or purpose for which the pesticide was applied --the date and place of application.	✓		
10	Is the chemical storage structure/area locked, well-ventilated, fire proof, and access is limited to select personnel?		✓	
Point totals for each column - Response percentage		6	3	1

Pollution Prevention

U.S. Air Force GEM program goals

- Employ practices that eliminate or avoid the potential for polluting the environment
- Guarantee that the golf course facility will not allow chemicals, fertilizers, detergents, or petroleum products they use to migrate outside their property boundaries
- Create and utilize a comprehensive pollution prevention plan for all aspects of the golf course and its facilities



Consider creating buffers around vulnerable water features.



Subsurface drainage helps cart wash water from transporting potential pollutants to water features on the course.

Observations

- Increase the use of slow release fertilizers
- Regularly provide training for all employees on the specifics of pollution prevention and how they can help
- Add appropriately designed and outfitted fueling capabilities to maintenance complex
- Although pesticide facility is functional, consider purchasing state of the art facility and siting it appropriately within the maintenance complex fencing

Pollution Prevention				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are there designated "no-mow" areas and established "no spray zones" and buffer areas around pond, river, stream, or lake edges and have they been communicated to mower operators and technicians?		✓	
2	A spill containment kit is readily available and spill containment procedures are in place?	✓		
3	Does the chemical storage area have a sealed metal or concrete floor and are all pesticides handled over an impermeable surface?	✓		
4	Does the chemical storage area have a lip along the edges to contain spills?	✓		
5	Are liquid products stored below dry products and are dry materials stored on pallets or shelves to keep them off the floor?	✓		
6	Has the Installation Spill Plan been amended to include the golf course facility?	✓		
7	Are grass clippings blown off equipment with compressed air instead of or prior to washing?	✓		
8	Are gasoline, motor oil, brake and transmission fluid, solvents, and other chemicals used to operate or maintain equipment and vehicles prevented from directly or indirectly entering water bodies?	✓		
9	Does the fuel storage and delivery area comply with local, state, and federal regulations?	✓		
10	Are slow-release fertilizers used to reduce the negative potential for runoff?	✓		
Point totals for each column - Response percentage		9	1	0

Conservation Practices

U.S. Air Force GEM program goals

- Use natural resources efficiently while respecting their long term value to the local community and the mission of the USAF
- Provide important greenspace benefits
- Closely monitor and manage water use to prevent unnecessary depletion of installation or local water resources



Caption.



Several bluebird boxes have been installed throughout the course.

Observations

- Incorporate contour mowing procedures on all fairways
- Protected plant management practices is a good teaming example between the golf course and environmental staffs
- Continue assisting the natural resources management in the protection and preservation of golf course archaeological sites
- Increase the plant diversity in forests along holes 1, 3, and 5
- Provide detailed input to the scheduled update of installation integrated natural resources management plan (INRMP)

Conservation Practices				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are all motorized golf course equipment checked regularly for excessive air polluting emissions?		✓	
2	Are there designated non-maintained or minimally maintained buffers around core wildlife habitats?	✓		
3	Has the irrigation system or its components recently been upgraded to reduce inefficiency, malfunction, and overall water use?	✓		
4	Has all "non-target" irrigation (ponds, out of play areas, etc.) been eliminated or minimized?		✓	
5	Have flow meters been installed to monitor water use and detect potential waste?	✓		
6	Has the property been examined for critical habitats, threatened or endangered species, wetlands, and floodplains?	✓		
7	Are employees encouraged to minimize their trips around the course to conserve on the use of fossil fuels?	✓		
8	Does the snack bar utilize reusable plates and silverware for use by customers throughout the facility's operating hours?		✓	
9	Have all potential wildlife habitats and their maintenance practices been coordinated with the installation BASH officer and environmental management personnel?		✓	
10	Are recycling containers conveniently provided for customer and employee use throughout the golf course facility?			✓
Point totals for each column - Response percentage		5	4	1

Water Resources

U.S. Air Force GEM program goals

- Minimize or eliminate potentially negative environmental impacts to all on- or off-site water resources
- Preserve water resources by using only those quantities required to maintain quality playing surfaces
- Ensure that any maintenance practices on or near water features are coordinated with appropriate personnel prior to taking action



Several streams meander through the rolling fairways of Pine Oaks.



Duck Lake as seen from the edge of the 10th.

Observations

- Add turf buffer strips to all water features to eliminate potential for trace fertilizer or pesticide runoff
- Begin long term process to replace potable water with recycled water for irrigation purposes
- Ensure that golf course staff receives regular data from any water quality monitoring activities on course water features

Water Resources				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are water features regularly monitored for algae, erosion, excessive aquatic plant growth, fish kills, and sedimentation?	✓		
2	Wash and wastewater is kept from making direct contact with surface water and is recycled or allowed to filter through a vegetative area when cleaning and maintaining equipment?	✓		
3	Outdoor irrigation of non-golf course areas and indoor plumbing are regularly monitored and maintained for leaks?	✓		
4	Has the golf course staff been provided with stormwater management planning requirements from the installation's environmental staff?			✓
5	Have part circle irrigation heads been installed where possible to preserve water resources and reduce maintenance while minimizing potential negative impacts to surrounding natural areas?		✓	
6	Are all water feature maintenance tasks coordinated with the installation natural resource manager and bird/wildlife aircraft strike hazard officer?		✓	
7	Has the irrigation system been completely checked for proper water distribution in all irrigated areas and are water leaks fixed in a timely manner?		✓	
8	Are the parking lots for customers and employees at least partially constructed with permeable surfaces and are they drained through an area of turfgrass or vegetation prior to discharge into a water feature?		✓	
9	Does the facility have a Drought Management Plan written, ready, and available when, or if, irrigation restrictions may be instituted?		✓	
10	Are water quality problems immediately reported to supervisors or regulatory agencies (if required) for appropriate action?	✓		
Point totals for each column - Response percentage		4	5	1

Maintenance Practices

U.S. Air Force GEM program goals

- Integrate the concept of ecosystem management into all course management decisions and practices
- Employ the principles of integrated pest management
- Document all activities for future reference
- Constantly examine management practices to look for improvements
- Insist on a well-trained staff



Is this Pinehurst? Or is it Pine Valley? Several other areas on the "dry side" of the course could be similarly developed.



Superintendent Tommy Stinson checks an irrigation controller.

Observations

- Increased number of trained scouts and general training and involvement of staff on integrated pest management procedures
- Compile written pest profiles of common pest species
- Improve water feature care to eliminate unwanted vegetation while improving aesthetics and habitat
- Need to secure quality computers and internet connection for maintenance staff use

Maintenance Practices				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Is contour mowing used to conserve fuel and increase playability and aesthetics?	✓		
2	Are there designated non-maintained or minimally maintained buffers around core wildlife habitats?	✓		
3	Are green, tee, and fairway mowing heights maintained at reasonable levels without continually stressing turf or maximizing chemical inputs?	✓		
4	Are there regular procedures in place to continually improve soil health such as organic amendments, aeration, and drainage?	✓		
5	Is there a map of the course's "hot spots" requiring special care or regular attention?		✓	
6	Is all maintenance equipment maintained and cleaned in a manner that eliminates the potential for spreading of contamination?	✓		
7	Has there been a complete examination for potential negative environmental impacts of all aspects of the operation including snack bar/grill, clubhouse, pro shop, and maintenance complex?		✓	
8	Are trees and other vegetation on the course maintained to encourage positive air flow and sunlight penetration to improve cultural conditions for the turfgrass as well as to minimize pesticide inputs?	✓		
9	Have all playing surfaces been inventoried and mapped for soil types including soil structure, nutrient levels, organic content, compaction, and water infiltration?		✓	
10	Are soil tests regularly used to determine nutritional requirements?		✓	
Point totals for each column - Response percentage		6	4	0

Customer Relations & Education

U.S. Air Force GEM program goals

- Ensure that the customer knows that their opinions count and will be acknowledged, assessed, and acted upon
- Educate the customers about the benefits of environmentally responsible golf course management and the future of the game and the environment
- Enlist customer support and assistance on caring for the course and its facilities as well as GEM Plan goals



A group of regulars launch their tee shots of the 10th with the beautiful still waters of Duck Lake in the background.



Designate a highly visible location to post environmental, maintenance, or course improvement plans, goals, and objectives for customers.

Observations

- Create a location to communicate to customers in the clubhouse with maps, drawings, newsletters, articles, etc.
- Interpret interesting environmental issues on the course with quality, durable signs
- Enlist installation environmental staff to lead regularly scheduled, conservation-based talks to customers and staff

Customer Relations & Education				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are the course manager and superintendent involved in a long-term customer educational program that is regularly updated and documented?		✓	
2	Is there a conveniently located and highly visible place at the course or clubhouse where golf course environmental management notices and informational messages are regularly posted?			✓
3	Do the course manager and superintendent actively communicate with customers to determine and document their points of view?	✓		
4	Is there active and regular communication with the Golf Council, Civil Engineering, Environmental Management, the Services manager, and commanders by course management?		✓	
5	Has the environmental management staff been asked to lead regularly scheduled educational seminars on the course's environmental challenges for golfers, commanders, and the golf staff?	✓		
6	Is there consistent and attractive signage around the course and grounds that would increase the awareness of the average golfer to the environmental management practices employed?		✓	
7	Are there signs appropriately located to warn golfers of hazards when drinking reclaimed or otherwise non-potable water?	✓		
8	Are there interpretive signs posted to highlight key habitats or have appropriate areas been designated "Environmentally Sensitive Zones" per USGA rules?		✓	
9	Are course staff members trained regularly on how to improve their dealings with customers?	✓		
10	Are there clinics provided to teach beginning golfers the basics of the game and to teach all levels of golfers the rules of the game?	✓		
Point totals for each column		5	4	1

Miscellaneous Special Projects & Activities

U.S. Air Force GEM program goals

- Educate the local community about the benefits of an environmentally responsible golf course management approach is for the future of the game and the environment
- Reach out to community youths to raise their awareness and appreciation for the game of golf and the GEM Plan principles
- Further the great game of golf at all times in as many ways as possible



Landscape development needs to be sensitively accomplished.



Pine Oaks hosts a tree nursery for the rest of Robins AFB.

Observations

- Conduct field trips at the course for local school children
- Enlist the assistance of local city and county officials on golf course environmental planning initiatives
- Initiate Earth Day environmental awareness golf tournament
- 30 bird boxes have been added throughout the course
- Need to demonstrate dedication to “growing” the great game of golf to young airmen, other installation non-golfers, and youth

Miscellaneous Special Projects & Activities				
#	Environmental Compatibility Indicator	Yes	Partial	No
1	Are there projects planned and funded for the next year that would communicate the compatibility of the course's management methods with protection of the environment?		✓	
2	Are there projects planned and funded to reduce the course's potential negative environmental impacts?	✓		
3	Are there environmental awareness raising tournaments planned?	✓		
4	Are there regular field trips for local students or other local community groups hosted at the course?		✓	
5	Are there projects planned to eliminate or minimize a potential erosion problem?		✓	
6	Does the course have a native tree installation program complete with planting plan and maintenance schedule?		✓	
7	Are any of the local schools or universities involved in educational or research activities at your course?			✓
8	Are there special facility-wide recycling programs underway?			✓
9	Is your course an active participant in the USAF Golf Environmental Management Program?	✓		
10	Has your facility been nominated by your MAJCOM for the golf course environmental management award in the last 3 years?			✓
	Point totals for each column	3	4	3

ECQ Summary

#	Environmental Compatibility Quotient Category	Yes	Partial	No
1	Overall Management Philosophy & Documentation	4	5	1
2	Safety, Training, & Awareness	4	5	1
3	Compliance	6	4	0
4	Pesticide Use, Storage, & Handling	6	3	1
5	Pollution Prevention	9	1	0
6	Conservation Practices	5	4	1
7	Water Resources	4	5	1
8	Maintenance Practices	6	4	0
9	Customer Relations and Education	5	4	1
10	Miscellaneous Special Projects & Activities	3	4	3
	Composite points & response percentage	52	39	9

GCEBA Results

* Pine Oaks Golf Course, Robins AFB, GA

- Actual ECQ (# of “Yes”) = 52 “Just started”

- Potential ECQ (Actual ECQ plus “Partial”) = 91 “Getting there”

Conclusion

Pine Oaks Golf Course Director of Golf, John Anderson is a happy guy. For good reason, as his Robins AFB golf facility is one of the jewels of the U. S. Air Force. The course is interestingly designed to reflect the ecology of the area with ample diversity to be enjoyed over and over by regular customers. A good value with a smile from the staff is all it takes to get folks coming back and Anderson, along with the rest of his staff at Pine Oaks, knows this well. Equipped with a fine clubhouse, ample water supply, and a climate ideal for the game, the probability for additional smiling in the future will continue to be high.

Environmentally, the Pine Oaks staff has distinguished itself by being the first to have a “Golf Course Environmental Smart Book”. Just a simple collection of requirements, regulations, plans, training requirements, and past ECAMP findings, the “Smart Book” is testament to Superintendent Tommy Stinson’s and his bosses’ dedication to their customers and the overall environmental compatibility of their facility.

Areas needing improvement

The ECQ Summary on the previous page highlights the following areas for relative improvement at Robins AFB:

- Overall Management Philosophy & Documentation
- Safety, Training, & Awareness
- Water Resources
- Miscellaneous Special Projects & Activities

The gallery

This section of the report will be where some of the more revealing photographs (of the literally hundreds taken during the site visit) of pests, maintenance practices, and other areas where improvements may be made to create the best possible golf facility.



Excellent view of the final green from the clubhouse patio.



This may be the finest “Director of Golf” office in the U. S. Air Force.



The 3rd is a beautiful, yet challenging one shotter.



A large Smooth Earth Snake hides in a shrub along cart path to 1st tee.



New azaleas are struggling in the full sun.



Better hit it straight here on the short par 4 15th.



Pine Oaks golfers must squeeze through this tunnel to reach the 13th.



Maintenance facility entry could use some "dressing up".



Turf bunkering adds a twist while minimizing maintenance.



Nicely maintained out buildings add to the quality experience.



Pine Oaks golfers' skills are regularly challenged.



Design decisions greatly affect long term maintenance requirements.



Overall interior design and amenities enhance customers' experience.

Environmental challenges

One of the important results of the GCEBA process is the identification of significant issues or challenges that should be addressed in the long term GEM Planning process. Ideally, the golf staff will address each issue from the best way to satisfy the goals of the golf facility and acceptable levels of course playability and customer satisfaction. The golf staff's preferred management approach for these issues should then be coordinated with the installation's environmental staff for refinement, coordination, and approval.

The GEM Plan would then consist of the environmental challenges, the approach to their management, a map showing where these challenges occur on the golf course, a booklet that describes the mapped challenges, goals and objectives for future years, and a set of best management practices.

The following environmental challenges were identified during the GCEBA process at Pine Oaks Golf Course, Robins AFB, GA:

- Erosion control/cultural resources
- Audubon Certified Cooperative Sanctuary Program
- Water conservation & water quality management
- State listed rare plant species
- Tree management
- Greens reconstruction project

EROSION CONTROL/CULTURAL RESOURCES

Through hard lessons learned from the past, information about an installation's archaeological or cultural resources is sensitive and must be protected according to the law as well as by painstakingly created procedures by many caring individuals and entities over a long period of time. Accordingly, the golf course is the site of cultural resources that are still being discovered. Soils are exposed and natural soil erosion has enabled some of the resource specimen to become visible to the casual observer. Care must be taken to protect these resources from impacts by the golf course staff as well as to purposeful, or even casual, "plundering" by customers or uninvited guests. The installation archaeologist should be consulted before any and all digging occurs at Pine Oaks Golf Course.



A cultural resource site is being investigated and documented.

AUDUBON CERTIFIED COOPERATIVE SANCTUARY PROGRAM

Pine Oaks Golf Course staff is proactively pursuing fully certified status in the Audubon Cooperative Sanctuary Program as created and managed by Audubon International, the former state of New York Audubon chapter. The program is internationally recognized for its contribution to the increased environmental stewardship of golf courses. Unfortunately, U. S. Air Force golf courses should almost never manage to increase, restore, create, or enhance wildlife habitats, one of the Audubon program's primary goals. The mission of the golf course is to provide recreational opportunities on quality turf while supporting the overall mission of the U. S. Air Force. Great care should be exercised on the types of improvements and management practices that are adopted under the guise of pursuing certification.

WATER CONSERVATION & WATER QUALITY MANAGEMENT

The golf course water bodies have the potential to receive inputs of pesticides, herbicides and fertilizer from course maintenance activities. Extreme care should be taken to ensure that projects are undertaken to accomplish appropriate goals for the right reasons that support the mission of safely flying airplanes.



Water quality is a significant environmental challenge at Pine Oaks.

Accordingly, turf buffers, no mow, and no spray zones should be created around all Pine Oaks water bodies and all pertinent golf course staff should be trained concerning water quality issues. Slow release fertilizers should be used whenever possible. No pesticides should be applied when potentially severe rainfalls are predicted or expected.

The INRMP states that concerted efforts to “promote and investigate opportunities for using treated wastewater for irrigation” should be undertaken. We believe in the very near future that all golf courses will only be irrigated with recycled water supplies. It is never too early for a golf course to begin studies to determine the feasibility and the potential quality and quantity of the valuable resource.

STATE LISTED RARE PLANT SPECIES

One of the most contentious issues facing environmental managers throughout DoD is dealing with plants, animals, or other critters protected under the Endangered Species Act. Fortunately for the Pine Oaks staff, their golf course has no species receiving protection under the law. Robins AFB does have ten state-listed rare plant species on the installation. One, the Ocmulgee skullcap, has been identified as residing along the 5th fairway of the Pine Oaks Golf Course. The staff has altered its mowing practices to allow the plant to sow its seed every year. The course has also posted signs to inform employees and customers of the plant's presence to further decrease the potential for negative impacts.

TREE MANAGEMENT

According to the INRMP, Robins AFB has attained Tree City USA status each of the last 8 years-quite a noteworthy accomplishment. The Pine Oaks Golf Course is currently housing the only tree nursery on the installation. The course's trees are an extremely valuable resource that to a large extent has not reaped the fruits of the Tree City USA program membership nor the tree nursery. A long-term tree planting effort should be undertaken by the installation at the course to ensure that many of the older trees will have their successors thriving nearby prior to their departure from this earth. Many of the course's trees are nearing the end of their published life spans. Some of the holes at Pine Oaks are reliant on these trees for definition as well as protecting players on adjoining holes.



Many of these trees are old enough to need successors.

GREENS RECONSTRUCTION PROJECT

Just after the data collection site visit was completed, the golf course was preparing to replace all of their greens from the ground up through a massive construction effort. The new greens will be rebuilt with state-of-the-art techniques that will provide near perfect agronomic conditions for growing high quality turfgrass. Tif Eagle is new turf variety chosen for the new greens. Unfortunately, Tif Eagle will require more of Superintendent's Tommy Stinson's time and effort than the old push-up greens. The maintenance program will be much more intensive as the new turfgrass will require more verticutting, top dressing, and aerating. In addition, the greens will be much larger (averaging 5500 square feet).

Bibliography

Audubon International, Environmental Performance Audit, *Integrated Environmental Management*, Golf Course Superintendents Association of America, February 2000, New Orleans, LA.

The Center for Resource Management, *Golf & the Environment: Charting a sustainable future*. Environmental Principles for Golf Courses in the United States, 1996, Salt Lake City, UT.

Environmental Management Directorate, Environmental Resources Division, *Integrated Natural Resources Management Plan*, September 2001, Robins AFB, Georgia 31098.

Pine Oaks Golf Course Staff, *Golf Course Environmental "Smart Book"*, undated.



"Thanks, y'all and hurry back!"





For additional assistance or more information, please contact:

Air Force Center for Environmental Excellence
Conservation and Planning Directorate

William H. Bushman – 210-536-3719 DSN 240-3719
AFCEE/ECE, 3300 Sidney Brooks, San Antonio, TX 78235-5112
bill.bushman@brooks.af.mil

Or visit our Golf Course Environmental Management Program webpage:
<http://www.afcee.brooks.af.mil/ec/golf/>